

Quiz 7, Out of 10 points, 2 bonus points

1. Let X and Y be independent random variables, with each one uniformly distributed in the interval $[0, 1]$.

(a) Find $P(Y < X^2 + 1/2)$

(b) Compute the pdf of $\min(X, Y)$

(c) Compute the pdf of $\max(X, Y)$

(5 points = 2 + 2 + 1)

2. Let X be a random variable with PDF $f_X(x)$.

(a) Find the PDF of $Y = |X|$.

(b) What is the pdf of $Y = |X|$ when X is exponentially distributed with parameter λ .

(c) Find the pdf of random variable $Z = Y + W$ when Y has pdf $f_Y(y)$, W is a r.v. with pdf $f_W(w)$ and Y and W are independent.

Hint: First find conditional PDF of Z given Y (by differentiating conditional CDF).

(d) **Bonus.** Use the above to find the pdf of $Z = |X| + W$.

(7 points = 2 + 1 + 2 + 2)